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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,345	07/25/2006	Christopher Bilson	4933/PCT	6639

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EXAMINER	
WIEHE, NATHANIEL EDWARD	
ART UNIT	PAPER NUMBER
3745	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,345	BILSON ET AL.	
	Examiner	Art Unit	
	NATHANIEL WIEHE	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07252006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 25 July 2006 is noted. The submission is in compliance with the provisions of 37 CFR 1.97 and 1.98. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely

exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

In the present instance, claim 17 recites the broad recitation "first turbine", and the claim also recites "particularly a medium pressure turbine of a gas turbine" which is the narrower statement of the range/limitation.

Additionally, claim 25 recites the broad recitation "A gas turbine", and the claim also recites "particularly an aircraft engine" which is the narrower statement of the range/limitation.

It is also noted that this type of broad followed by narrow claim limitation format is utilized throughout both claims 17 and 25 and each instance needs to be corrected.

Claims 18-24 and 26-32 are rejected due to their dependence from independent claims 17 and 25, respectively.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17-19,21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Junggren (1,326,867). Junggren discloses an arrangement for detecting a shaft break, i.e. wheel loosening on the shaft (Junggren page 1, line 16-22), in an elastic-fluid

turbine, i.e. gas turbine. The device includes a radially inwardly positioned operator element (25) with a sensor element (22) guided in the stator (16) of a turbine stage. Junggren notes that the turbine may include any number of stages and the sensing device may be placed in any desirable location (Junggren 95-105). The emergency condition is detected by the operator element (25) and converted to an electrical signal that is transmitted to a switching element (8) positioned radially outward of the flow channel of the turbine and on the housing of the turbine (See Fig. 3). The operator element is positioned downstream of the turbine to be sensed on the first stator vane of the adjacent rotor. The sensor element (22) or wire is guided radially within the stator vane (16) and is thereby withdrawable therethrough. Further, the radially inward end of the sensor element (22) cooperates with the operator element (16) such that the operator element (16), in response to a shaft break, is moved onto and hits the sensor element resulting in the production of the electrical signal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Junggren (1,326,867) in view of Jeffery (4,498,291). Junggren disclose the invention substantially as claimed except for the use of a shear pin to hold the operator element. However, Jeffery discloses an overspeed avoidance device for a gas turbine. Such a

device operates similarly to that of Junggren in that it is designed to prevent operation of the turbine under conditions likely to result in significant damage. Further, Jeffery's device utilizes an operative element (90) connected unitary component (122) to the stationary vane (26). (See Figs. 2,4). Jeffery also notes the use of shear pins (132) holding the operative element (90), by its attachment to unitary component (122), thereby preventing accidental triggering of the device or assuring triggering of the device only when the shaft breaks. (Jeffery column 4, lines 28-33). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the detection arrangement of Junggren by securing the operative element with a shear pin as taught by Jeffery for the purpose of preventing false actuation of the device or to assure that the device is triggered only when the shaft breaks.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Junggren (1,326,867) in view of Mulera et al. (6,607,349), hereinafter "Mulera". Junggren discloses the invention substantially as claimed except for the use of an impact type sensor. However, Mulera discloses a device for detecting the breakage of a turbine shaft that includes an impact type sensor. That is that the sensor includes an operative element (30) that is driven into and breaks or changes the structure of the sensor element, i.e. link (24), thereby creating the electronic signal indicating the shaft break. Both Mulera and Junggren are related as emergency condition detecting devices in use in gas turbine. The only lacking component of Junggren is the use of the particular sensor type that is known in the art to be utilized for the same function, as evidenced by Mulera. Therefore, it would have been obvious to one of ordinary skill in

the art at the time the invention was made to modify the arrangement of Junggren by substituting the wear-away sensor for an impact-type sensor as taught by Mulera since such a modification would be a simple substitution of parts yielding predictable results, i.e. generation of an electronic signal.

Claims 25-27,29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grieb (3,887,147) in view of Junggren (1,326,867). Grieb discloses a gas turbine engine, particularly for an aircraft engine including two compressors (2,3) a combustion chamber (5) and three turbines; a high pressure turbine (6), a medium or intermediary turbine (7) and a low pressure turbine (8). Or more simply, Grieb discloses a three-spool aircraft engine. However, Grieb does not disclose the use of an arrangement for detecting a shaft break. Junggren discloses an arrangement for detecting a shaft break, i.e. wheel loosening on the shaft (Junggren page 1, line 16-22), in an elastic-fluid turbine, i.e. gas turbine. The device includes a radially inwardly positioned operator element (25) with a sensor element (22) guided in the stator (16) of a turbine stage. The emergency condition is detected by the operator element (25) and converted to an electrical signal that is transmitted to a switching element (8) positioned radially outward of the flow channel of the turbine and on the housing of the turbine (See Fig. 3). The operator element is positioned downstream of the turbine to be sensed on the first stator vane of the adjacent rotor. The sensor element (22) or wire is guided radially within the stator vane (16) and is thereby withdrawable therethrough. Junggren's device allows for the signaling and automatic shutdown of a turbine under conditions likely to cause damage (Junggren page 1, lines 16-22). Further, the radially

inward end of the sensor element (22) cooperates with the operator element (16) such that the operator element (16), in response to a shaft break, is moved onto and hits the sensor element resulting in the production of the electrical signal. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the three-spool aircraft engine of Grieb by utilizing an arrangement for detecting shaft breakage as taught by Junggren for the purpose of signaling or automatically shutting down the turbine under conditions likely to cause damage to the turbine. Further, Junggren notes that the turbine may include any number of stages and the sensing device may be placed in any desirable location (Junggren 95-105). One of ordinary skill in the art would readily recognize such a desirable location as being in between the various turbine stages, thereby allowing for identification of which particular shaft has been damaged.

Claims 28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grieb (3,887,147) in view of Junggren (1,326,867) as applied to claim 25 above, and further in view of Jeffery (4,498,291). Grieb disclose the invention substantially as claimed except for the use of a shear pin to hold the operator element. However, Jeffery discloses an overspeed avoidance device for a gas turbine. Such a device operates similarly to that of Junggren in that it is designed to prevent operation of the turbine under conditions likely to result in significant damage. Further, Jeffery's device utilizes an operative element (90) connected unitary component (122) to the stationary vane (26). (See Figs. 2,4). Jeffery also notes the use of shear pins (132) holding the operative element (90), by its attachment to unitary component (122), thereby

preventing accidental triggering of the device or assuring triggering of the device only when the shaft breaks. (Jeffery column 4, lines 28-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the detection arrangement of Grieb by securing the operative element with a shear pin as taught by Jeffery for the purpose of preventing false actuation of the device or to assure that the device is triggered only when the shaft breaks.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grieb (3,887,147) in view of Junggren (1,326,867) as applied to claim 25 above, and further in view of Mulera et al. (6,607,349), hereinafter "Mulera". The modified invention of Grieb discloses the invention substantially as claimed except for the use of an impact type sensor. However, Mulera discloses a device for detecting the breakage of a turbine shaft that includes an impact type sensor. That is that the sensor includes an operative element (30) that is driven into and breaks or changes the structure of the sensor element, i.e. link (24), thereby creating the electronic signal indicating the shaft break. Both Mulera and Junggren are related as emergency condition detecting devices in use in gas turbine. The only lacking component of Junggren is the use of the particular sensor type that is known in the art to be utilized for the same function, as evidenced by Mulera. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the turbine of Grieb by substituting the wear-away sensor of Junggren for an impact-type sensor as taught by Mulera since such a modification would be a simple substitution of parts yielding predictable results, i.e. generation of an electronic signal.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The published patent application of Bilson discloses a turbine shaft break detector that is markedly similar to applicant's claimed invention. The patent issued to Gordon et al. discloses a warning system for a turbine utilizing acoustic sensors.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHANIEL WIEHE whose telephone number is (571)272-8648. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571)272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NATHAN WIEHE/
Nathan Wiehe
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/Edward K. Look/
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